



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/595,660	05/03/2006	Yuichiro Shindo	OGOSH53USA	4264
270 7590 04/12/2010 HOWSON & HOWSON LLP 501 OFFICE CENTER DRIVE SUITE 210 FORT WASHINGTON, PA 19034			EXAMINER ROE, JESSEE RANDALL	
			ART UNIT 1793	PAPER NUMBER
			NOTIFICATION DATE 04/12/2010	DELIVERY MODE ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@howsonandhowson.com

Office Action Summary	Application No. 10/595,660	Applicant(s) SHINDO, YUICHIRO	
	Examiner Jessee Roe	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 February 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,8-11,13-15 and 17-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-2, 8-11, 13-15 and 17-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>12 February 2010</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of the Claims

Claims 1-2, 8-11, 13-15 and 17-19 are pending wherein claims 8 and 13 are amended and claims 3-7, 12 and 16 are canceled.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 8-10, 13-15 and 17-19 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In regards to claims 8, 13 and 17, the specification does not provide support for the range in the recitation "wherein said high purity hafnium of said sputtering target has a residual resistance ratio of 120 to 200".

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

Art Unit: 1793

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-2, 8-11, 13-15 and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shindo (US 2003/0062261).

In regards to claims 1-2 and 11, Shindo ('261) discloses a high purity hafnium metal with minimal impurities (abstract). Shindo ('261) discloses (Example 2) forming a 4N (99.99%) purity level hafnium metal excluding gas components such as carbon, oxygen, and nitrogen [0133]. Oxygen and carbon would be present at levels less than 500 ppm and forming a sputtering target or thin film and zirconium would present at levels of 0.5 weight percent or less ([0064] and claim 7).

The Examiner notes that the composition disclosed by Shindo ('261) overlaps the composition of the instant invention, which is prima facie evidence of obviousness. MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the claimed amount of gas components such as oxygen, carbon, and nitrogen from the amounts disclosed by Shindo ('261) because Shindo ('261) discloses the same utility throughout the disclosed ranges.

With respect to the recitation "a sulfur content of 10wtppm or less, a phosphorus content of 10wtppm or less, and a zirconium content of 0.1wt% or less" as in claims 1-2, the Examiner notes that purer forms of known products may be patentable, but the mere purity of a product alone does not render the product unobvious. MPEP 2144.04 (VII).

With respect to the amended transitional term "consisting" in claim 2, the

Art Unit: 1793

Examiner notes that the products disclosed by Shindo ('261) does not require elements in addition to hafnium. Therefore, Shindo ('261) meets the claim.

With respect to the recitations "wherein said high purity hafnium of said sputtering target has a residual resistance ratio of 120 to 200" of claims 8, 13 and 17, and "wherein said oxygen content is 10wtppm or less" of claims 9, 14 and 18, Shindo ('261) discloses that oxygen would be reduced to 500 ppm or less [0064]. Therefore the recited residual resistance ratio would be expected. MPEP 2112.01 I.

With respect to the recitation "wherein said sputtering target has a body produced by subjecting a hafnium raw material to electron beam melting to form a hafnium ingot, subjecting the ingot to deoxidation with molten salt, and forming a sputtering target from the ingot after said deoxidation" of claim 10, the Examiner notes that the claims are drawn to a product and not a process. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.

With respect to the recitation "wherein said thin film a sputtered thin film produced by subjecting a hafnium raw material to electron beam melting to form a hafnium ingot, subjecting the ingot to deoxidation with molten salt, forming a sputtering target from the ingot after said deoxidation, and depositing said thin film on

Art Unit: 1793

the substrate by performing sputtering with the sputtering target" of claim 15, the Examiner notes that the claims are drawn to a product and not a process. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.

With respect to the recitation "wherein said high purity hafnium is produced by subjecting a hafnium raw material to electron beam melting to form a hafnium ingot and subjecting the ingot to deoxidation with molten salt" as in claim 19, the Examiner notes that the claims are drawn to a product and not a process. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.

Claims 1-2, 8-10 and 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over the ASM Handbook Volume 2.

In regards to claims 1-2, the ASM Handbook Volume 2 discloses (pg. 1094, cols. 2-3) purifying metals such as hafnium to a purity approaching 99.999% by chemical vapor deposition when a low-iron starting material would be used.

Art Unit: 1793

The ASM Handbook further discloses that if the proper temperature is maintained, oxygen, nitrogen, hydrogen, carbon, and other typical metal impurities would not be carried over.

The Examiner notes that the purity of the hafnium disclosed by the ASM Handbook Volume 2 overlaps the purity of the instant invention, which is prima facie evidence of obviousness. MPEP 2144.05 I. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the claimed hafnium purity from the hafnium purity disclosed by the ASM Handbook Volume 2 because the ASM Handbook Volume 2 discloses the same utility throughout the disclosed range.

With respect to the recitation "A sputtering target or thin film, comprising a sputtering target or thin film formed of high purity hafnium", the Examiner notes that although the ASM Handbook Volume 2 does not specify the size of the hafnium metal, "a sputtering target or thin film" is not defined to exclude any specific size or shape of metal. Furthermore, changing the size/proportion of the hafnium metal would not patentably distinguish over the prior art. MPEP 2144.04 (IV).

With respect to the amended transitional term "consisting" in claim 2, the Examiner notes that the ASM Handbook Volume 2 does not require elements in addition to hafnium. Therefore, the ASM Handbook Volume 2 meets the claim.

With respect to the recitations "wherein said high purity hafnium of said sputtering target has a residual resistance ratio of 120 to 200" of claims 8 and 17, and

“wherein said oxygen content is 10wtppm or less” of claims 9 and 18, the ASM Handbook Volume 2 discloses (pg. 1094, col. 2) discloses that oxygen would not be carried over. Therefore the recited residual resistance ratio would be expected. MPEP 2112.01 I.

With respect to the recitation “wherein said sputtering target has a body produced by subjecting a hafnium raw material to electron beam melting to form a hafnium ingot, subjecting the ingot to deoxidation with molten salt, and forming a sputtering target from the ingot after said deoxidation” of claim 10, the Examiner notes that the claims are drawn to a product and not a process. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.

With respect to the recitation “wherein said high purity hafnium is produced by subjecting a hafnium raw material to electron beam melting to form a hafnium ingot and subjecting the ingot to deoxidation with molten salt” as in claim 19, the Examiner notes that the claims are drawn to a product and not a process. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior

product was made by a different process.

Response to Declaration Under 37 C.F.R. §1.132

The Declaration under 37 CFR 1.132 filed 12 February 2010 is insufficient to overcome the rejection of claims 1-2, 8-11, 13-15 and 17-19 based upon Shindo (US 2003/0062261) and claims 1-2, 8-10 and 17-19 based upon ASM Handbook Volume 2 as set forth in the last Office action because:

The Applicant primarily declares to add additional Examples and an additional Comparative Example of the present invention.

In response, additional Examples and a Comparative Example would introduce new matter into the specification and 35 U.S.C. 132(a) prohibits the introduction of new matter into the disclosure. Additionally, the Examiner notes that the Applicant fails to specify where these Examples originate and those who performed the Examples.

Response to Arguments

Applicant's arguments filed 12 February 2010 have been fully considered but they are not persuasive.

First, the Applicant primarily argues that one of ordinary skill in the art is clearly taught by the specification of the present application that one of the objectives of the present invention is to provide a hafnium material have a high residual resistance ratio. The Applicant cites page 3, lines 1-4; page 4, lines 19-21; and page 5, line 33 to page 6, line 2:

"In particular, materials having a high residual resistance ratio are being demanded, and, since a high purity hafnium material could not be obtained conventionally, it was not possible to sufficiently meet the demands as electronic component materials since the residual resistance ratio was low";

"Moreover, it is possible to obtain a thin film having a high residual resistance ratio from the high purity hafnium material, which will be able to sufficiently meet the demands as an electronic component material"; and

"Moreover, a material having a high residual resistance ratio can be obtained from the foregoing high purity hafnium material as described in the following Examples, and it is possible to sufficiently meet the demands as an electronic component material."

The Applicant further argues that specific examples of hafnium materials according to the present invention are disclosed on pages 6-8 of the instant specification as Examples 1-3, the residual resistance ratio of these examples are 120, 190 and 200 and therefore it is reasonably conveyed that the "high residual resistance ratio" is in the range of 120 to 200.

"With respect to the foregoing Examples 1 to 3, results of measuring the residual resistance ratio are shown in Table 4. As a result, as shown in Table 4, the residual resistance ratio at the ingot stage in Examples 1, 2 and 3 is respectively 38, 22 and 45, but respectively increased after deoxidation at 200, 120, and 190. Like this, it is evident that hafnium having a high residual resistance ratio can be obtained from hafnium having ultra high purity."

In response, the Examiner is not contending whether or not residual resistance ratio values of 200, 120, and 190 are considered to be high. The Examiner is contending that there is inadequate support for the claimed range of "a residual resistance ratio of 120 to 200" and this position is based on the lack of support for the ranges as claimed. There is support for residual resistance ratios of 120, 190 and 200, but not the entire range of 120 to 200.

Second, the Applicant primarily argues that the hafnium sponge obtained according to Example 1 in the instant specification was subjected to the identical treatment disclosed in Shindo ('261) and the hafnium material of this Example had an

Art Unit: 1793

oxygen content of 250 wtpm which does not meet the limitations stated in independent claims 1, 2 and 11 and therefore cannot provide a residual resistance ratio of 120 to 200.

In response, oxygen is not required in the final product of Shindo ('261) and therefore the Applicant's argument is not persuasive.

Third, the Applicant primarily argues that the lower limit of the oxygen and zirconium contents achievable by one of skill in the art following the teachings of Shindo ('261) is an oxygen content of 120 ppm and a zirconium content of 0.24 weight percent, both of which are outside the scope of independent claims 1, 2 and 11.

In response, Shindo ('261) discloses upper limits for components such as oxygen and zirconium and a minimum content of specific elements cannot necessarily be associated therewith.

Fourth, the Applicant primarily argues that electron beam melting is described in Shindo ('261) and electron beam melting cannot reduce oxygen to levels required by the present application.

In response, the Examiner notes that claims are drawn to a product and not a process and the amount of impurities in the final product would not only depend on the method of oxygen removal, but also the impurity concentrations in the starting material.

Fifth, the Applicant primarily argues that the ASM Handbook Volume 2, pp. 1093-1097, does not provide any analytical data concerning the impurities contained in hafnium and the Examiner's assertion that "the purity of hafnium disclosed in the ASM Handbook Volume 2 overlaps with the purity of the instant invention" is erroneous. The

Art Unit: 1793

Applicant additionally argues that the reference (Ref. 5) referred to by the ASM Handbook Volume 2 provides actual data relative to hafnium, and the purity and oxygen content are well outside the scope of the claims of the present application and references the last few lines of page 76 where it is stated:

"Hafnium that was prepared in six deposition experiments ranged from 98.92 to 99.22% purity and contained 140 to 500 ppm oxygen".

The Applicant then concludes that the hafnium material is not of 4N (99.99%) purity as required by the instant claims and the oxygen content is not 40 wtppm or less as required by the instant claims.

In response, the Examiner notes that according to the ASM Handbook Volume 2, to achieve the purity level of 99.999%, the starting metal must have a purity of about 99.9% and be a low-iron starting metal (pg. 1094, col. 3). Since none of the hafnium final products disclosed in Rolsten (Iodide Metals and Metal Iodides) have a purity greater than 99.22%, it is clear that the starting metal did not have a purity of 99.9% (since 99.9% is of higher purity than 99.22%). However, it is also quite clear that if one skilled in the art applied to 99.9% purity hafnium metal having low iron then a final product having a purity level of 99.999% hafnium could be achieved by chemical vapor deposition (CVD) according to the ASM Handbook Volume 2 (pp. 1094, cols. 2-3). Therefore, Applicant's arguments are not persuasive.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jessee Roe whose telephone number is (571)272-5938.

Art Unit: 1793

The examiner can normally be reached on Monday-Thursday and alternate Fridays 7:00 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/ Roy King/
Supervisory Patent Examiner, Art
Unit 1793

/JR/